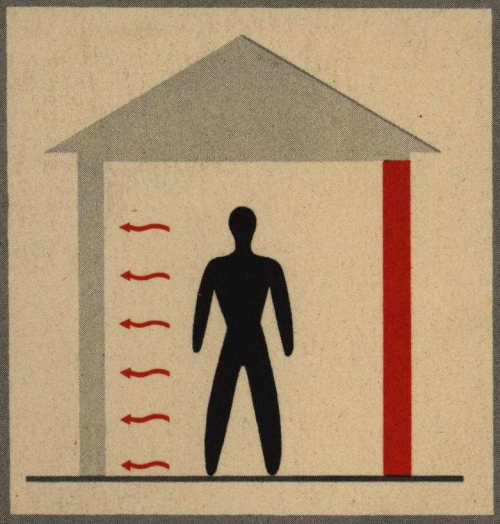
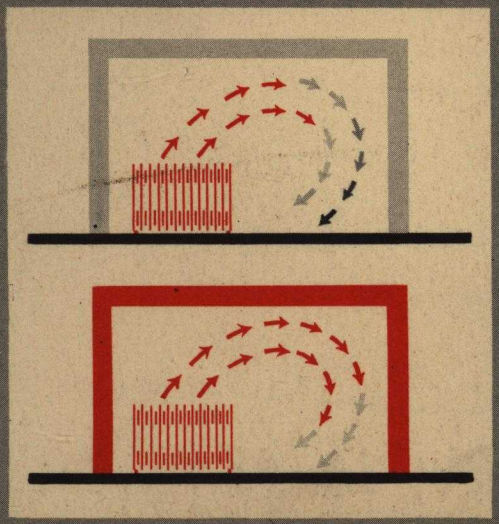


INSULATION AND YOUR HOME



PRICE 25 CENTS

Second Edition. Printed in U.S.A.

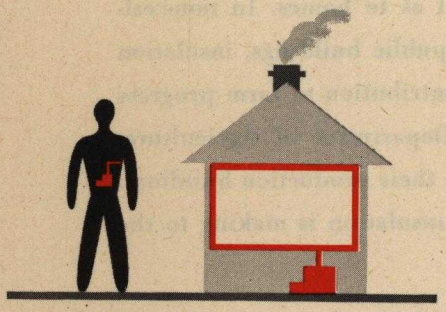
To choose insulation for your home wisely requires a thorough knowledge of the general properties of insulating materials. This booklet is designed to give the home-owner a practical understanding of Mineral Wool insulation, its uses, its forms, its methods of installation, its heat-resistant properties, its endurance, its fire resistance, and other points of importance. For the first time, *Yardsticks* have been developed to determine the relative comfort and economy ratings, as well as the savings in fuel costs, achieved by various thicknesses of Mineral Wool insulation. Through the use of these *Yardsticks*, you can choose the measures by which you will give your home maximum protection against winter cold and summer heat.

The same principles apply to all structures as well as to homes. In non-residential structures, those of farming, industry, commerce and in public buildings, insulation is bringing comfort to workers and economy to the owners. Its contribution to farm progress has been especially important. For the past twenty years the Department of Agriculture, through hundreds of bulletins, has been urging farmers to insulate their production buildings. Today every progressive farmer is conscious of the contribution insulation is making to the efficiency of these buildings.

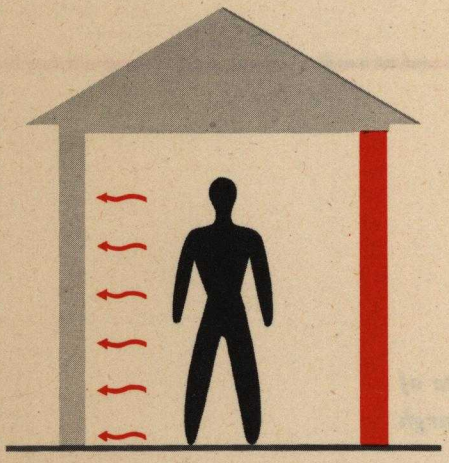
The text of this manual has been submitted to the board of eminent experts listed below. These men, whose unbiased scientific knowledge is well known, have certified that the facts presented herein are correct insofar as precise scientific knowledge can be translated into layman's language.

INSULATION
AND YOUR HOME

The why, when, where and how much of insulation; a handbook for everyone who owns, buys or builds a home



● Every human being has his own built-in, personal heating system to keep him warm. The object of heating a house is to keep this body warmth from being drawn away too fast.



● If the heat radiating from your body is absorbed too rapidly by a nearby cold surface, you will feel uncomfortably chilly. All room surfaces in your home should be built to maintain uniform, comfortable temperatures.

CLOTHING FOR YOUR HOME

● THIS is the simple story of insulation, what it is, what it does, how it works to make you more comfortable in your home. American ingenuity and scientific skill have worked together to make your home healthier, pleasanter than ever before. Some of this is achieved through carefully studied design, some through new machines to do our chores. But one of the most important developments, a silent partner to comfort, is insulation. Time-tested, proved, it provides a degree of livability with economy that can be duplicated by no other machine or agent.

For insulation is a cloak for your house. It saves you heat and fuel the way warm clothing saves you energy. Moreover, because of a peculiar property of heat, insulation actually adds to your comfort during all extremes of winter and summer weather. And this comfort can really be measured.

Just how does insulation work? First of all, to understand it, let us examine the personal heating system. Your body has its own furnace and, unless you are ill, stays at one temperature, normally 98.6° F., summer and winter. The amount of heat you generate is, in fact, more than you can stand, and you are constantly throwing heat off. If you did not, you would suffer from fever. But, when this heat escapes too fast, you feel cold, shiver, and have goose flesh as your body works hard to make up for its loss.

There are three ways you can lose heat. If you sit on a cold stone step, or a metal chair, you feel instantly the discomfort that comes from the contact of your warm body with a colder surface; this way of losing heat by contact is called *conduction.*

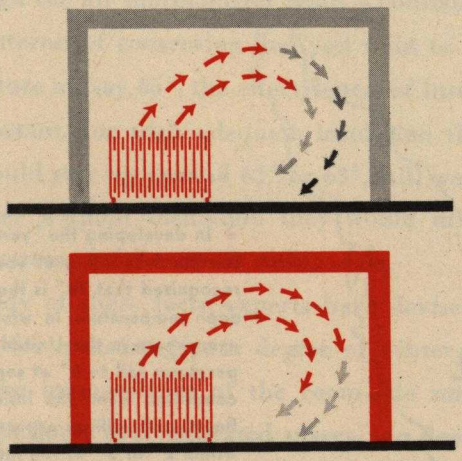
Drafts across your ankles or down your neck are unpleasant, because they remove heat unevenly; the moving air carries away heat by *convection.*

The heat you lose by the third method is less obvious, but in its understanding lies the secret of assuring comfort in your home. *Radiated* heat moves at high speed through the air without heating it, and flows in direct lines from a warm surface to a cooler one. Sun heat is radiated heat; heat going from your body to a nearby cold object, like a wall, is also radiated heat.

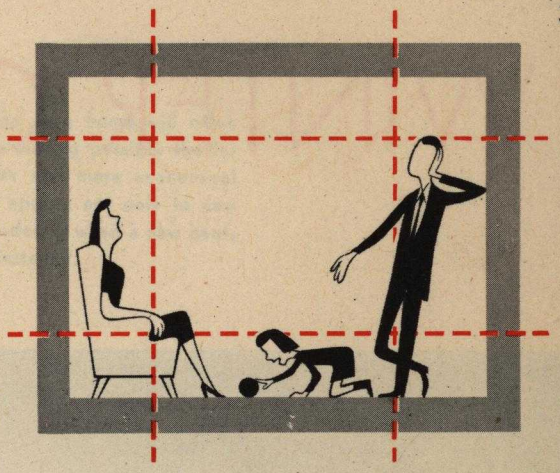
You can warm the furnishings, the objects you touch in your home, by heating the air, as your furnace does. You can close windows to avoid drafts. But even if your room air is heated to a livable 70°, you cannot be comfortable when cold walls, ceiling, and floor are drawing too much heat from your body.

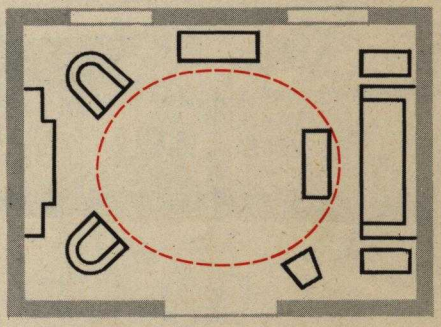
In a sense, then, your body heat is heating your own walls. Heated air warms the walls too, but without protection it cannot keep up with the loss to the outside cold. Here, then, is insulation's simple job — to make walls, ceilings, and floors resistant to the flow of heat. Indoor heat stays within such walls to create a surface temperature near that of the indoor air. And you say, without realizing why, "My, what a cozy room!"

The temperature barrier of insulation works in reverse during hot weather, and if you are planning your own "strategy of comfort," you will want to understand the year-round job of insulation.



● Cold walls and ceilings steal your heat, keep you uncomfortable in cold weather even when air is 75°. Insulation conserves heat, provides greater comfort even at lower temperatures.





● Although a cold floor is recognized by everybody as a source of discomfort, and undesirable for children playing upon it, far fewer people realize that a cold wall is quite as likely to cause a chilly feeling. In most rooms the center is left relatively clear, while furniture groups are placed near the walls. Thus you are frequently sitting or standing close to at least one wall. The space within the dotted lines in both illustrations limits the comfort zone when the house is not insulated. Adequate insulation should be made an essential part of the construction of any floor, wall or ceiling exposed to unheated spaces or the outdoor air. This is the modern way of adding built-in comfort to what used to be merely shelter.

● Go into a vacant, unheated house some bleak day and note how it seems even colder in the house than out of doors. The reason: you are closely surrounded by cold surfaces.

WINTER COMFORT

IN YOUR HOME

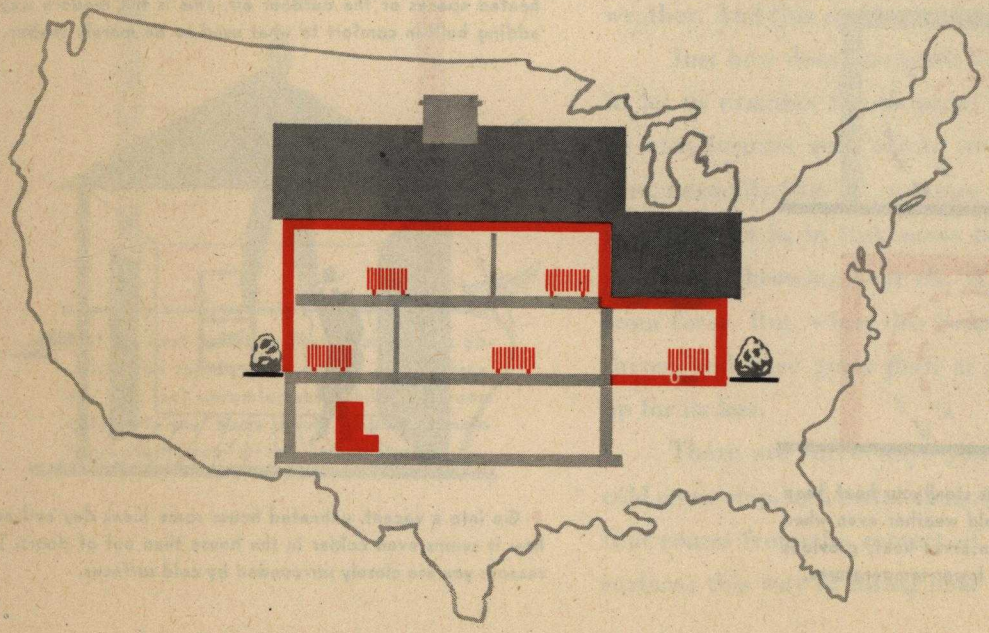
● Snow disappears quickly from the roof of an uninsulated house like the one shown at the right above. This demonstrates dramatically that heat loss is no mere scientific theory but a very real and expensive fact. It takes a lot of heat to melt a roof-load of snow on a cold day.

IN the foregoing chapter, you read how your body gives off its surplus heat by conduction, convection, and radiation; how the largest part of it radiates through the air to some colder surface such as walls, floors, ceiling; why in winter you want these surfaces to be nearly as warm as the air, so they will draw a minimum of heat from your body.

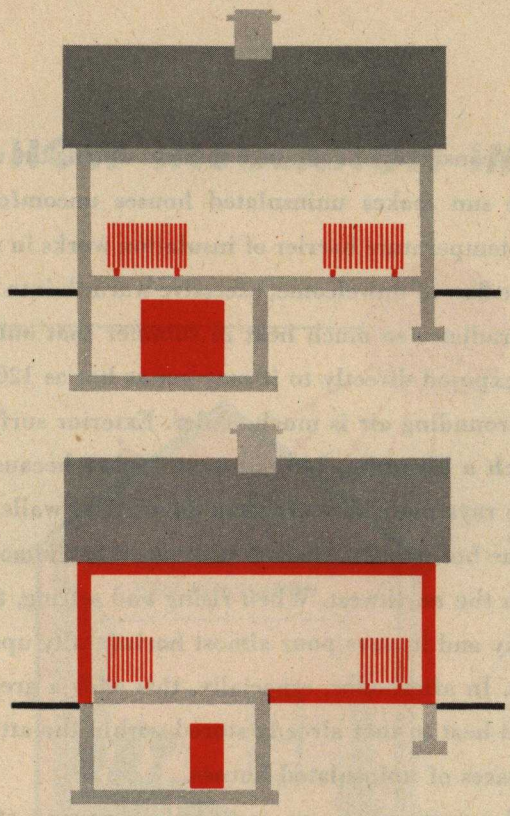
Insulation can provide these warm wall, ceiling, and floor surfaces in winter. Further, it is possible to measure the degree of comfort and the attendant fuel economy which you will enjoy as the charts on pages 8 and 9 show.

First, let us consider how winter comfort can be measured.

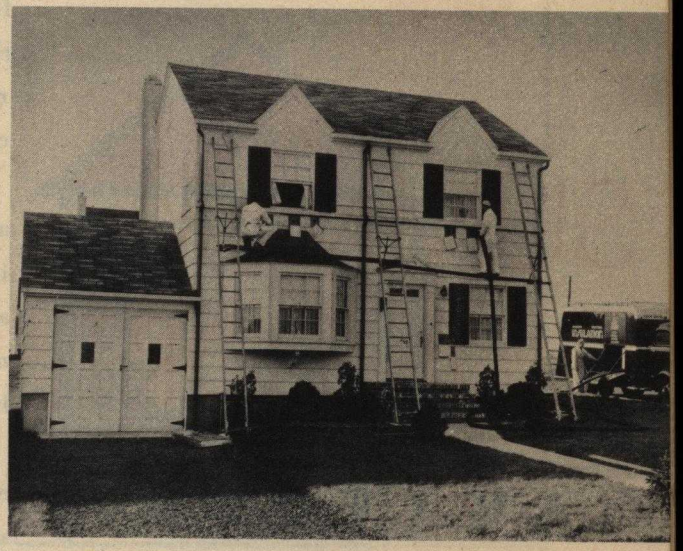
With a temperature barrier of sufficient insulation, the inner surfaces of your house have a temperature very close to that of the indoor air. For example, when the weather outdoors is zero and the indoor air 70°, a well-insulated wall will have a surface temperature of around 67°, only three degrees cooler than the inside air.



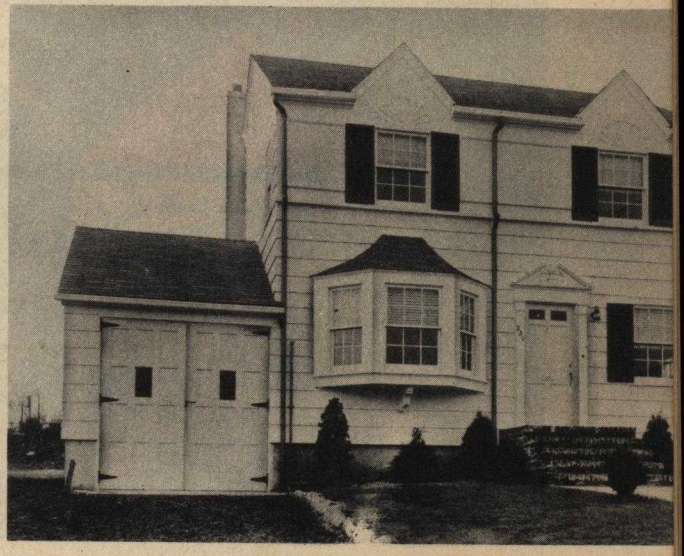
● In developing the "yardsticks" that measure the comfort rating of your home, it has been recognized that 70° is the widely accepted indoor temperature in winter and that almost everywhere in the United States outdoor temperatures fall to 0° at some time. Under these conditions when the inside surfaces of walls, floors, and ceilings exposed to the cold remain within 2° or 3° of the indoor air temperature, your house may be rated excellent in comfort. If these surfaces are more than 10° or 12° colder than the air, the comfort rating is poor.



● Thorough insulation of a home will often save its own cost by making possible the installation of a smaller and more economical heating system. This applies not only to new construction but remodeling when a new heating system is to be installed.



● These two identical houses at Belleville, N. J., were subjected to an interesting test. The house above was fully insulated in walls and ceiling.



● This house was insulated in the ceiling only. In a six month test it was found that the fully insulated house consumed 340 gallons less fuel. (See page 13.)

But under the same circumstances, with an uninsulated brick, concrete, or frame wall of ordinary construction, the inner surfaces will be approximately 59°, or eleven degrees colder than the room air. By comparing these two examples you will see that there is a difference of 8° in the wall temperatures of the insulated and uninsulated walls — a very vital 8° which determines whether you can relax in comfort or will feel chilly in a room, even though the air thermometer reads a constant 70°.

If in the interest of conserving fuel you want to maintain a lower temperature of, say 65°, the effectiveness of insulation is even more important, for with adequate insulation the inside wall surfaces should stay up around 62° or 63°, still well within the comfort zone. Without insulation they would drop down to 55° — to the bottom of the comfort rating scale.

From a study of these facts, experts have devised a very simple *Yardstick* for measuring your degree of winter comfort. They compare the temperatures of the room-side surfaces of outside walls (also floors over unheated spaces, top floor ceiling or roof) with indoor temperatures, and can immediately forecast how easily a house can be kept warm in winter. You, too, can forecast the comfort rating of your own house by studying the charts on pages 8 and 9.

SUMMER COMFORT IN YOUR HOME

LET us briefly consider your summer comfort during the months when the sun makes uninsulated houses uncomfortable. Then the temperature barrier of insulation works in reverse by retarding the flow of unwelcome, excessive warmth into homes.

The sun radiates so much heat in summer that outer surfaces of walls exposed directly to it may get as hot as 120° even though the surrounding air is much cooler. Exterior surfaces of roofs may reach a blistering 140° or even higher because they catch the sun's rays more directly than do vertical walls.

During the hot months, the sun rises early in the northeast and sets late in the northwest. When rising and setting, the sun is low in the sky and its rays pour almost horizontally upon east and west walls. In afternoons, especially, this adds a great deal more unwanted heat to that already stored within the attics and hollow wall spaces of uninsulated houses.

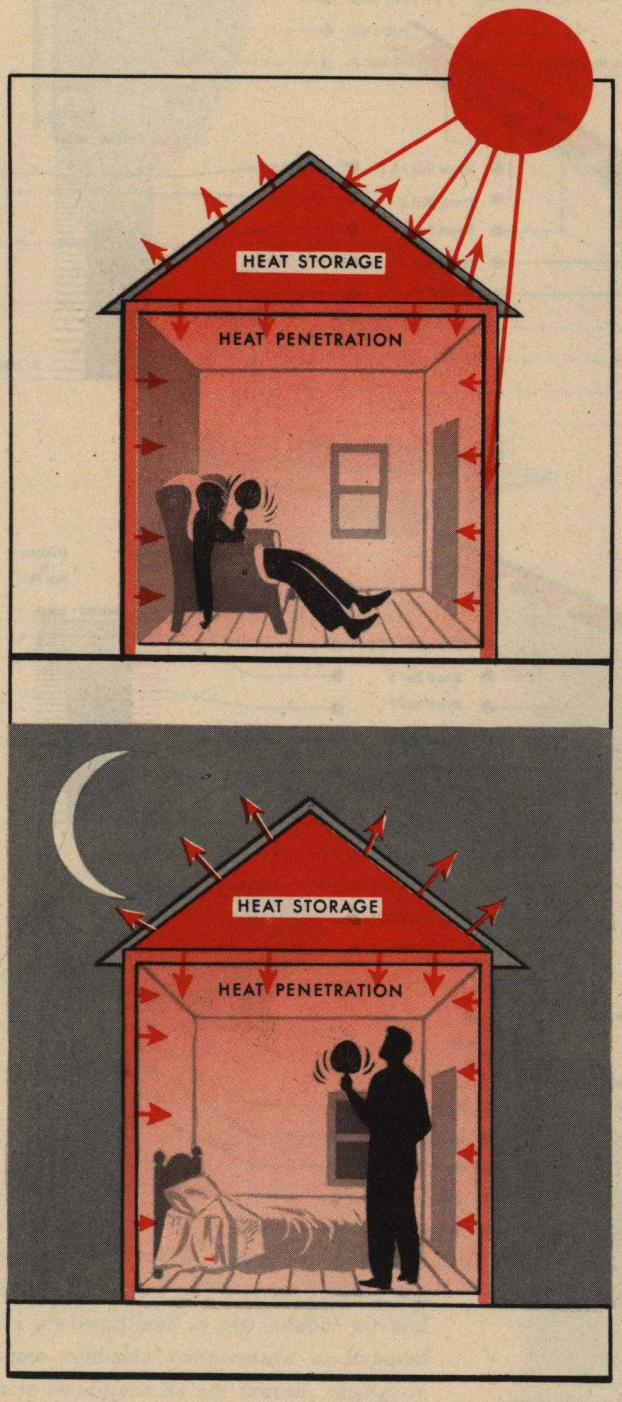
Our bodies, remember, are constantly throwing off heat, even in summer. If we get too warm, they start their own cooling system of perspiration. In an uninsulated house, with walls and ceilings heated to high temperatures by the sun, the rooms become oppressively hot. When personal cooling systems cannot cope with the heat being radiated from the hot walls and ceilings, we suffer from excess warmth.

By evening, the heat in sun-baked walls and attics of uninsulated houses has made huge, heat-holding "fireless cookers" of them and they continue to discharge heat into the house far into the night.

The way to keep out much of this unwanted summer heat, of course, is to retard its seepage through side walls and ceilings with an adequate amount of insulation. The principle is the same one used in keeping heat *out* of your refrigerator. In other words, insulation works to exclude unwanted heat in summer, just as in winter it serves to retain within your home the heat you have to pay for.

So if your home is insulated for the chief purpose of providing winter comfort and economy, you are getting at the same time, and at no extra cost, an additional and valuable dividend in relief from summer discomforts.

HOW INSULATION IMPROVES SUMMER COMFORT



HEAT PENETRATES UNINSULATED WALLS AND CEILINGS FAR INTO THE NIGHT

INSULATED WALLS AND CEILINGS RESIST HEAT PENETRATION DAY AND NIGHT

Rate your own home by these new yardsticks of comfort and economy

● With these charts you can judge what Mineral Wool insulation will do for your enjoyment and for your pocketbook. They apply equally well either to the house you now live in or to the one you plan to build.

All you need to do is to compare the construction of your house to the corresponding wall, floor, and attic drawings and see how it rates. If in any part no insulation is used, or only a scant amount, the charts show how much improvement the use of more Mineral Wool insulation will bring. The long black lines on this chart are spaced in accordance with the resistance to heat flow obtained by varying thicknesses of Mineral Wool.

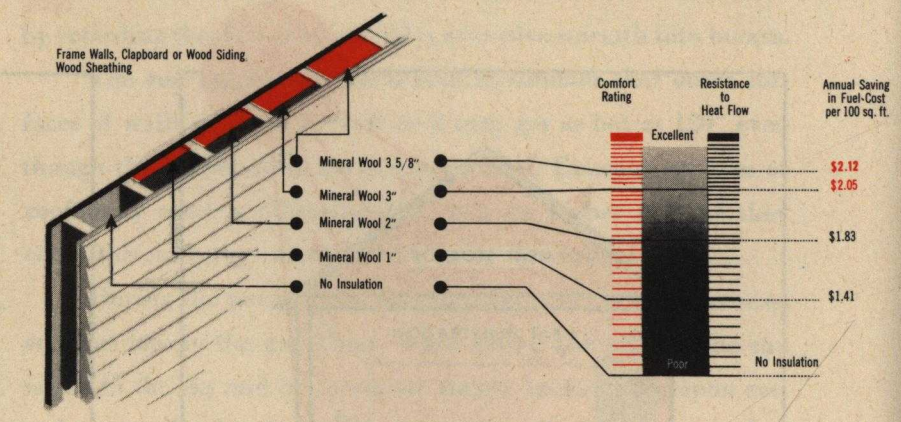
The left-hand bar, printed in red on the charts, shows the new *Yardstick of Comfort* and serves to illustrate how inside surface temperatures are affected by the thickness of Mineral Wool shown. Thus, the height at which the black lines cross this bar, and the comparative spacings of the red lines, indicate the degree of comfort which can be expected.

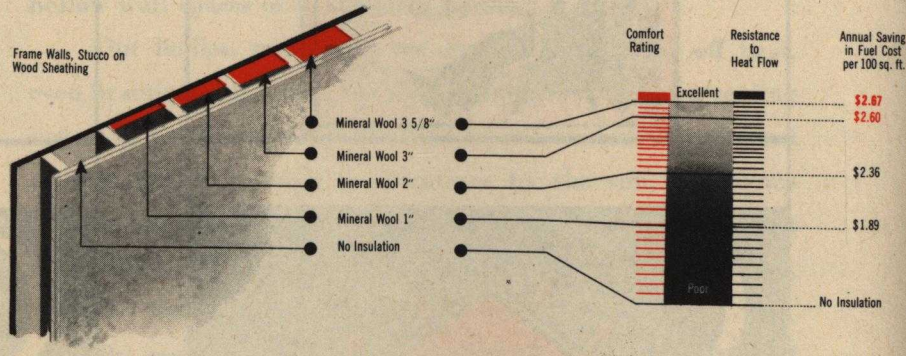
The right-hand bar, printed in black, shows the new *Yardstick of Economy*. Here again, the height at which the long black lines cross the bar, and the comparative spacing of the graduated lines, indicate the amount of heat saved through the construction illustrated. The adjacent dollar figures show the approximate annual savings in fuel cost per 100 square feet of insulated area.

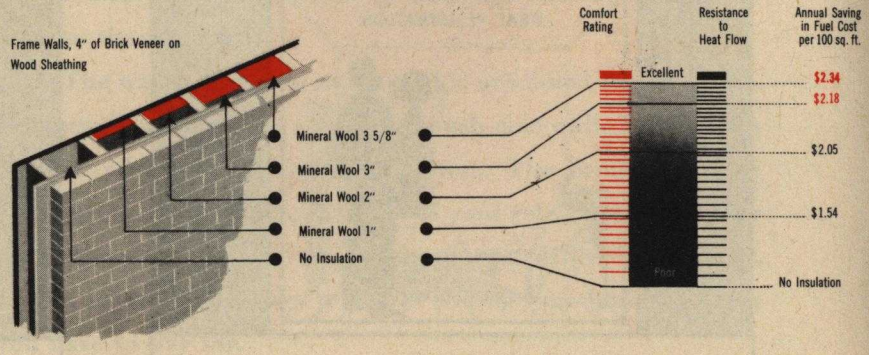
These bars and dollar figures apply to the combination of construction materials forming the entire wall, ceiling, or floor, not merely to the insulating materials.

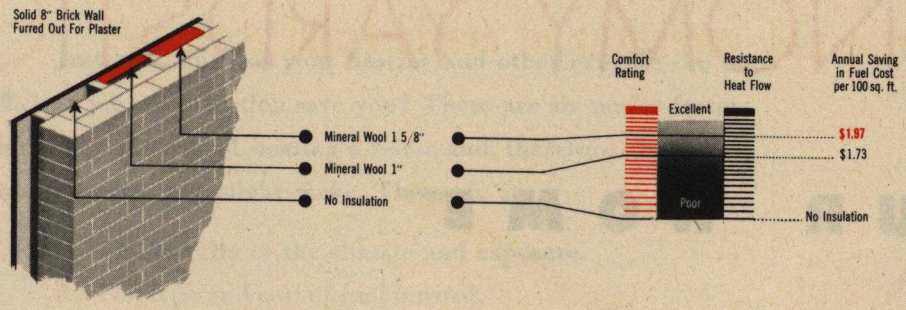
They are based on an arbitrarily chosen set of conditions—a house in the climate of Chicago, with a 70° indoor temperature, and heated by an oil burning furnace of average efficiency using fuel oil costing 7¢ per gallon. The values will, of course, vary for different regions, as well as for different furnaces and costs of fuel, but the relationship of the figures will remain the same for any house, anywhere, burning any kind of fuel.

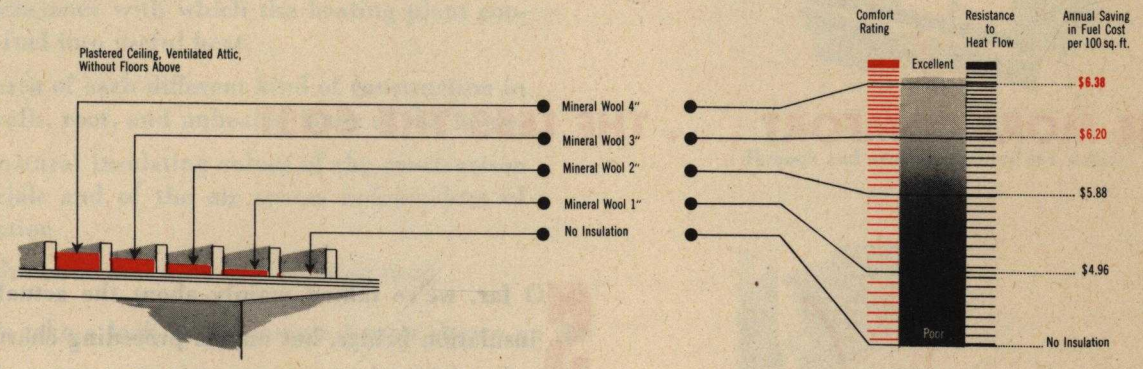
Devised by authorities on insulation, these charts demonstrate clearly that the comfort rating reflects the economy rating of any house—the more the comfort the greater the economy.

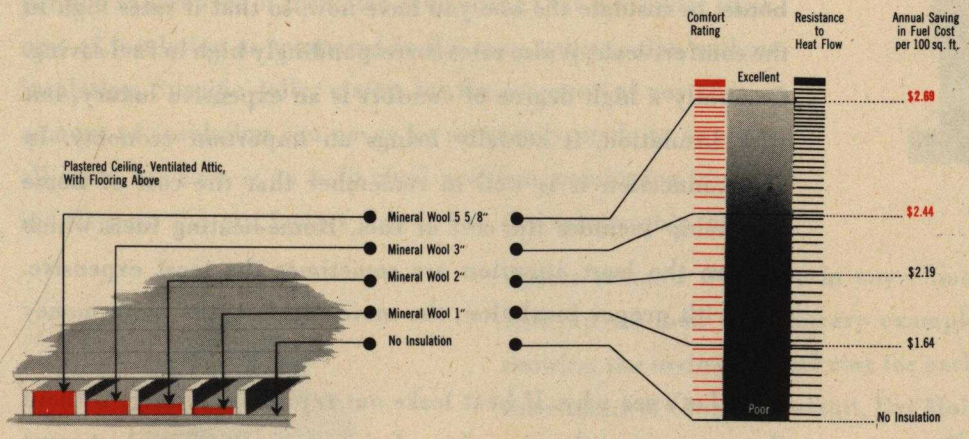


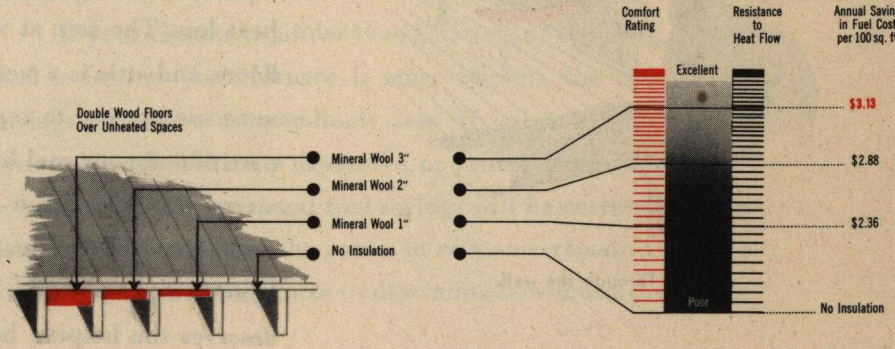










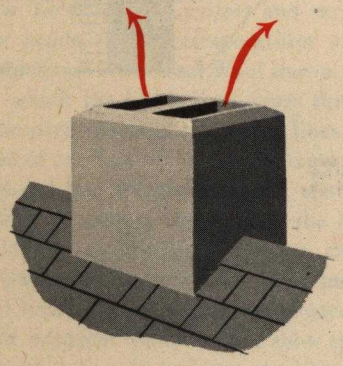


**Note: Values used in these charts are based on the assumption that attics and spaces beneath unheated floors are ventilated to the outdoor air and have the same cold-side temperature as exposed walls. If these conditions do not prevail, savings in fuel cost will be slightly less than the amounts shown.*

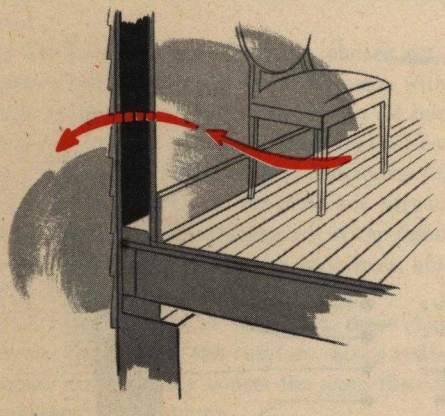
AN ECONOMY YARDSTICK

FOR YOUR HOME

THE MORE COMFORT . . . THE LESS THE COST



• Up the chimney.



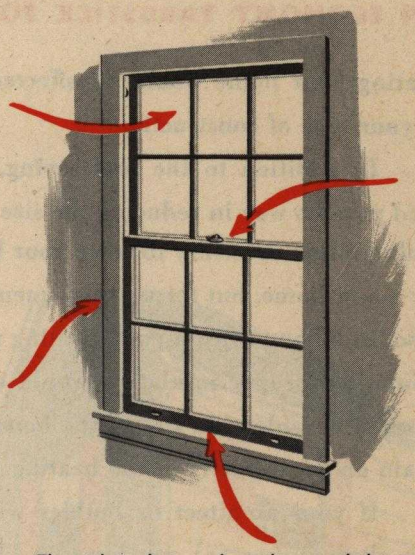
• Through the wall.

SO far, we've talked mainly about the actual comfort that insulation brings, but on the preceding charts you see that economy goes hand in hand with comfort. If you build a house, or insulate the one you have now, so that it rates high in the comfort scale, it also rates correspondingly high in fuel-saving. Generally a high degree of comfort is an expensive luxury, but with insulation, it actually brings an important economy. In this connection it is well to remember that the cost of home ownership includes the cost of fuel. Home-heating fuels which require the least attention are sometimes the most expensive. But with proper insulation, the more comfort, the more money saved.

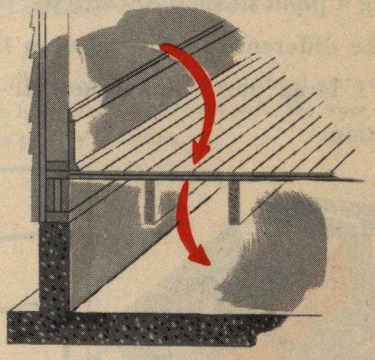
Let's see why. If heat leaks out rapidly in winter, without the temperature barrier of insulation, your heating plant must work longer and harder – consume more fuel to make up the heat loss. The rate at which heat flows out through walls, cold floors, and attic is a measure of the extra fuel your heating plant must use up, just to replace this wasted heat. It's as though you partitioned your coal bin, and said, "This is for coal to keep me warm; this is for throw-away fuel." Many new developments have made the modern furnace more efficient, more automatic and labor-saving; but the better the heating system, the more it deserves the helping hand of insulation to retain its efficiently produced heat.

Just how much of your heating and other expense can an efficient job of insulation save you? There are six major factors that affect the cost of heating a house and, therefore, the saving that improvement might make. These six are:

1. The severity of the climate and exposure.
2. The type and cost of fuel burned.
3. The efficiency with which the heating plant converts fuel into useful heat.
4. The area of each different kind of construction in the walls, roof, and unheated floors of the house.
5. The natural insulating values of the construction materials and of the air spaces independent of insulation.
6. The thickness and kind of insulation used.

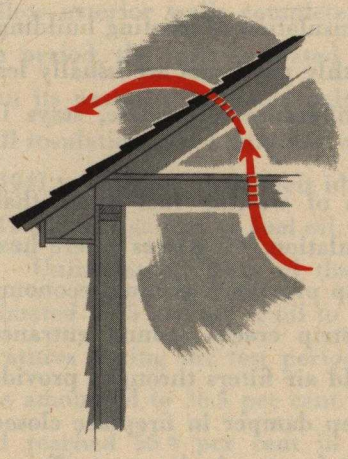


• Through and around windows and doors.



• Through the floor.

Now, let's take a look at the savings figures shown on the charts. Each figure given is the saving that should be obtained per 100 square feet of insulated area, using that particular thickness of insulation as compared to the same construction without insulation. Specific dollar claims for the economy of any type or amount of insulation can never be accurately made to apply to all cases, for each is an individual problem, combining in varying degrees the six factors listed, but the relationship of the figures remains the same in any climate, burning any kind of fuel. So we took an arbitrary example and based our figures, showing the savings in fuel cost for each type of construction, in the climate of Chicago, Detroit, Des Moines, Cleveland, or Boston maintained at 70° indoors and heated with an average oil-burning furnace using fuel oil that cost 7¢ a gallon.



• Through the ceiling.

If your climate is milder than Chicago, or the price of your fuel is less, or your furnace is more efficient, the annual fuel savings will be correspondingly less. If your climate is more severe, or your fuel more expensive, or your heating plant wastes a lot more heat, the annual fuel savings will be correspondingly larger. In other words, the ratios in economy remain the same and you can use these figures to determine how much the cost of

CONTINUED

heating your home would be affected by the use of insulation in your type of construction.

In addition to the fuel saving, good insulation properly used pays its way in reducing the size and cost of the heating or cooling plant necessary to serve your home. This is true not only for a new home, but for a replacement unit in an existing home. Also, in a home with a good heating plant, but with inadequate insulation, proper insulation would enable you to add another room of considerable size to the house without imposing undue strain on the capacity of the heating system.

If your architect or builder will accurately compare the two alternatives: (a) putting in a big heating plant and using little or no insulation, (b) using adequate insulation and installing a plant of smaller capacity, he will be able to show you that the difference in cost between the two heating plants will cover a large part — sometimes all — of the cost of thorough insulation.

● The severity of the climate; the colder it is, the more money you save by insulating.

● The cost of fuel; the more it costs, the more you can save by insulating.

Remember, too, that extra fuel for the oversize heating plant must be paid for every year. The initial cost of insulation is the only cost. Fuel savings soon repay that investment and keep on paying dividends. Time-payment plans are available through savings and loan associations, commercial bankers or other lenders for the purpose of insulating homes. In new construction, long-term financing up to 90 per cent of the cost is permitted for Mineral Wool insulation. Such loans may be guaranteed by the FHA. Both in the insulation of existing buildings and in new construction the monthly payments are usually less than the savings in fuel. The difference, of course, stays in your pocket.

There are, of course, ways of wasting fuel other than through the lack of adequate insulation. All places where heat leaks occur should be fixed to help provide maximum economy and comfort. Calk and weatherstrip cracks around entrance doors and windows where any cold air filters through; provide storm sash for your windows, keep damper in fireplace closed when no fire is going, keep your furnace in its most efficient

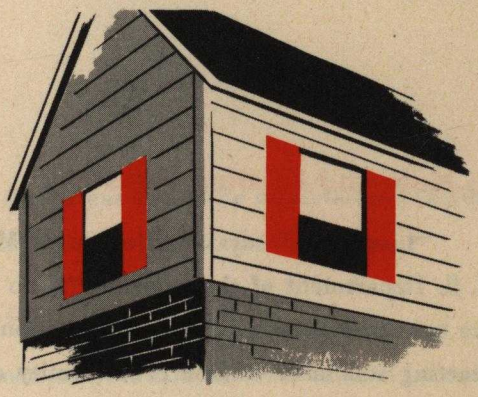
● The efficiency of your furnace; the less efficient it is, the more you can save by insulating.

working order. Furnace heat that goes up the chimney may represent from 20 per cent to more than 50 per cent of the heat value in the fuel you buy, depending upon the efficiency of your plant and the use of automatic controls. More or less uncontrollable causes of heat loss are: windows opened for ventilation at night and to "air out" rooms in daytime; the normal passage of people in and out of entrance doors.

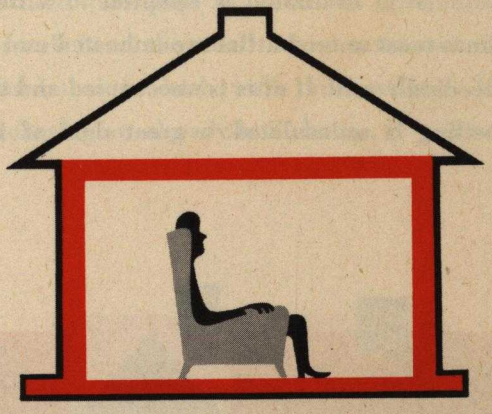
It is because heat can escape in so many different ways that home-owners are often misled by the claims of one fuel-saving product or another. Insulation can make large savings over uninsulated construction only in the areas where it is used; storm sash can save over single windows only in the window areas where they are applied; weatherstripping can only stop leakage of air where cracks were formerly present; and improved heating equipment can save only part of the heat that formerly went up the chimney. Each saving is genuine, but the amount depends upon how much of the total heat loss is due to the element to be improved.

Insulation is usually the most important means of saving fuel and gaining comfort because it affects the largest areas of heat loss in most homes and works for you both in winter and summer. A practical working test on two identical two-story frame houses in Belleville, New Jersey, emphasizes that statement. One has four inches of Mineral Wool over the second-story ceiling only, the other has four inches in the ceiling and the hollow exterior walls completely filled. During the six-month test period, the fully insulated house used 29 per cent less oil than its partially insulated neighbor. In terms of dollars, side wall insulation saved annually an extra $30.60. From December 1, 1941 to May 31, 1942, their identical heating plants consumed 1147 and 807 gallons of fuel oil, respectively. (See page 5.)

Uninsulated, either of these houses would have used an estimated 1805 gallons of oil to maintain equivalent inside temperatures during the test period. Estimated fuel savings therefore amounted to 36.5 per cent in the partially insulated house and reached 55.4 per cent in the fully insulated one — convincing evidence that insulation more than pays for itself in fuel economy and added comfort.



● The area of different structural materials; the larger the area of cold walls, the more you can save by insulating.



● The amount and kind of insulation employed; use plenty of the best, and economy will follow comfort.

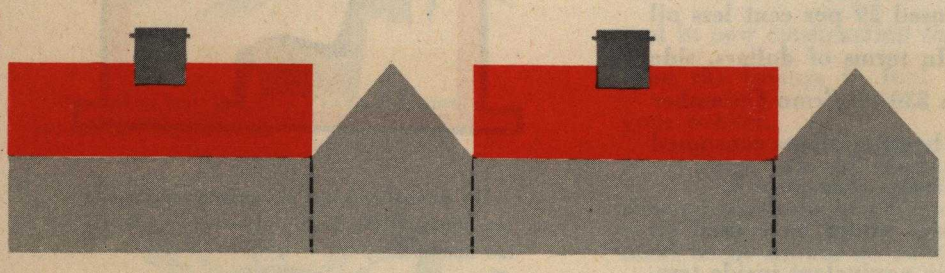
WHERE AND HOW TO USE

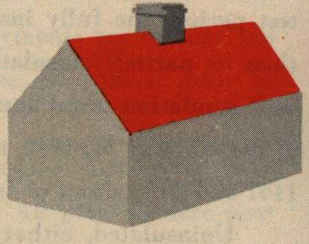
In New and Existing Houses

"Insulation," says the Bureau of Mines of the U. S. Department of the Interior, "is no better than the man who installs it." Good insulation is made to exacting standards to insure uniformity of performance, and must be applied strictly in accordance with manufacturer's specification. The areas which require insulation include ceilings or roofs (or attic knee-walls and collar beams, also the horizontal area behind the knee-walls), exterior walls and some floors.

Attic insulation is essential to a thorough job since most unused attics are unheated and become exceedingly cold. If attic is unoccupied and the top-floor ceiling is uninsulated, a great deal of heat is lost through this ceiling into the unheated attic and out through the roof. Therefore the ceiling should be insulated. When the attic is occupied, the insulation should be installed between the roof rafters, collar beams and knee-wall studs, also the horizontal area behind the knee-walls. It is usually a simple matter to install insulation in attic areas.

When attic insulation alone has been installed, let us keep in mind that such insulation cannot be expected to provide temperatures in the comfort range on the room-side surface of the outside walls. Without wall insulation you are still losing an appreciable amount of heat which can be saved and which will increase the comfort. From the standpoint of winter





ONE-STORY HOUSE UNFOLDED

• These unfolded houses demonstrate two things. First, that it is not wise to generalize about relative heat loss through the attic and walls since the wall area of houses which may occupy the same amount of land can differ materially if one is one-story high and the other two-stories. Second, that despite the undisputed importance of attic insulation there is normally a considerably larger expanse of wall to be considered. This is especially significant in view of the importance of "surface temperature."

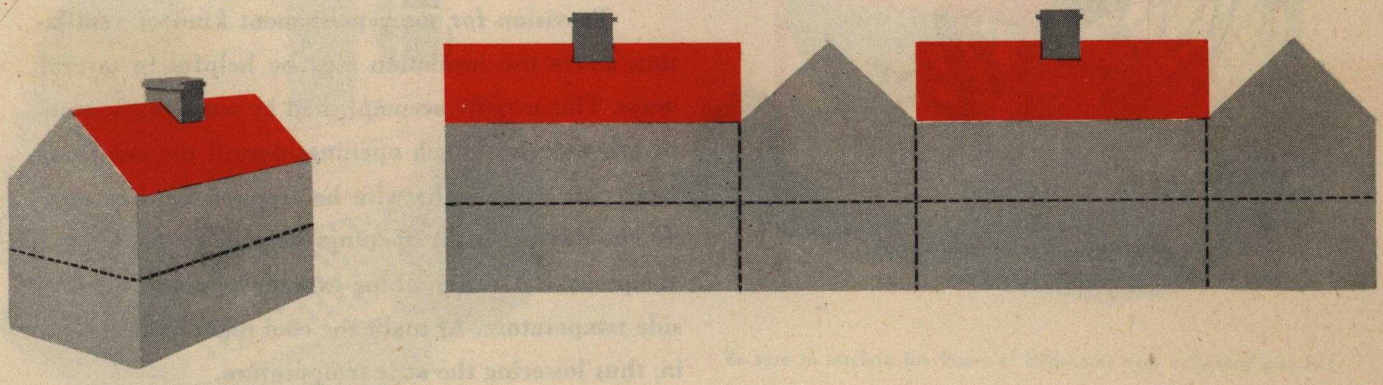
INSULATION

comfort and economy in fuel-savings, remember that the total area of the walls is materially greater than the area of the roof or top-story ceiling in most buildings, By way of illustration, on this page and the preceding one are shown two *unfolded* houses. Note how the proportion of wall area exceeds the roof area even in the one-story house.

Insulation, of course, is needed in cold floors — especially those built over unheated spaces between the ground and the living rooms above. Such areas occur, for example, under porches that have been fitted with windows to convert them into sun rooms; over unheated garages; and in all houses that are built without basements but with floors raised above the ground. All such areas should be insulated to provide balanced comfort and to reduce heating costs.

In New Construction

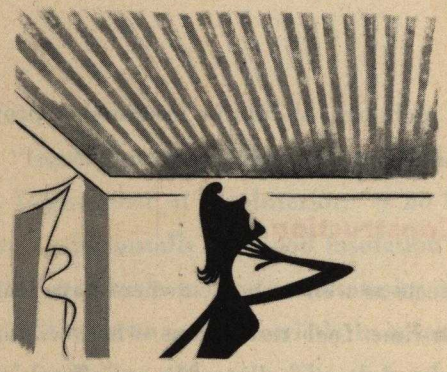
Architects as well as home-owners have learned through war-time fuel restrictions what economies can be expected by installing Mineral Wool while houses are in course of construction. If you are planning to build, you and the architect should be thoroughly familiar with the proper forms of Mineral Wool to be used (see page 22) and the economies which will result from the small initial extra cost of full-thick insulation in both walls and ceilings. If you are purchasing an already-built house, it will be



TWO-STORY HOUSE UNFOLDED

CONTINUED

advisable for you to inquire specifically from the builder whether he has or has not included Mineral Wool and find out in what locations (walls, ceilings or floors) it has been used, and in what thicknesses.



● Dusty lath-marks on your ceilings often result when cold attic floors are uninsulated.

In Existing Houses

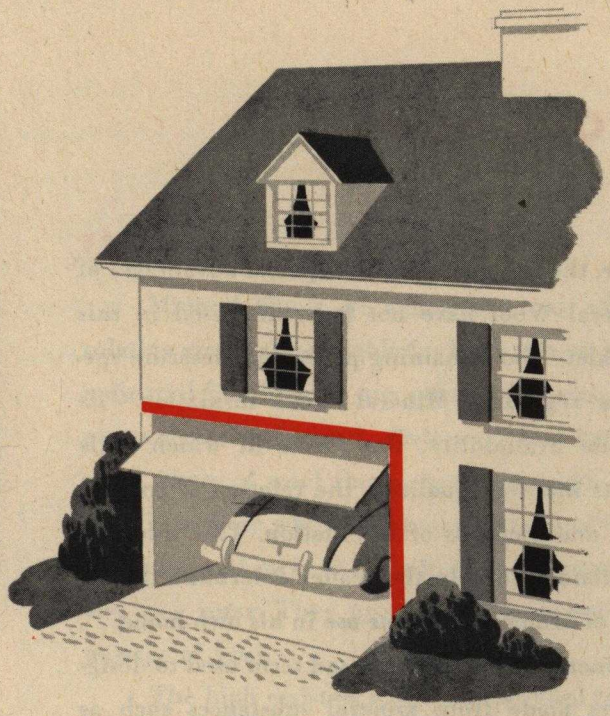
Walls and ceilings of virtually every existing house can be insulated by the use of a machine which blows a fluffy, light-weight Mineral Wool insulation into the hollow spaces. Skilled workmen can insulate the structure in a short time and leave it with practically no visible sign that the clapboards or other surface materials have ever been disturbed. It is also possible to use batt or blanket type Mineral Wool in accessible ceiling and floor areas of existing houses. (See page 22.) If the attic is finished as living quarters, the insulation may be blown between the ceiling and roof boards; if ventilation is desired, collar beams may be installed to provide suitable space above the insulation. If the attic is not to be used, the insulation may be installed over the top-story ceiling.

● Cold walls can create drafts, especially dangerous to children playing on the floor.

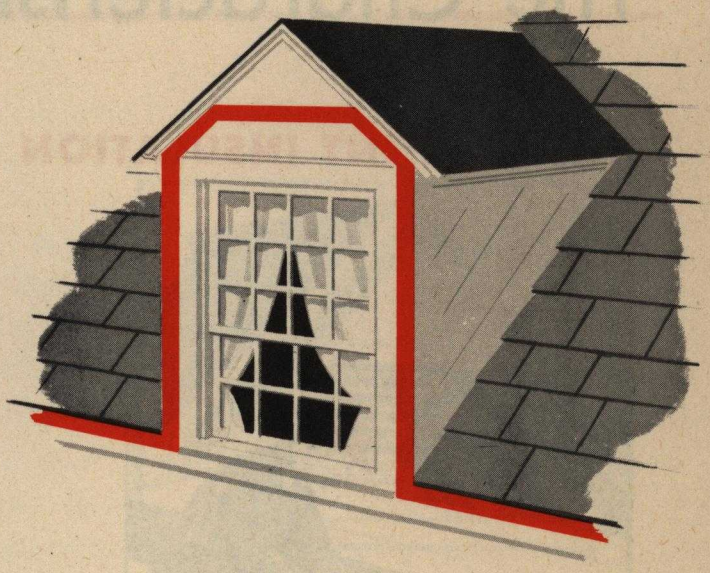
Attic Ventilation

Provision for some permanent kind of ventilation above the insulation may be helpful in several ways. This may be accomplished by windows, louvers or other devices. Such openings permit the escape of heat that would otherwise be trapped in that area. In the daytime such openings help to keep the attic temperature from climbing excessively above the outside temperature. At night the cool night air can flow in, thus lowering the attic temperature.

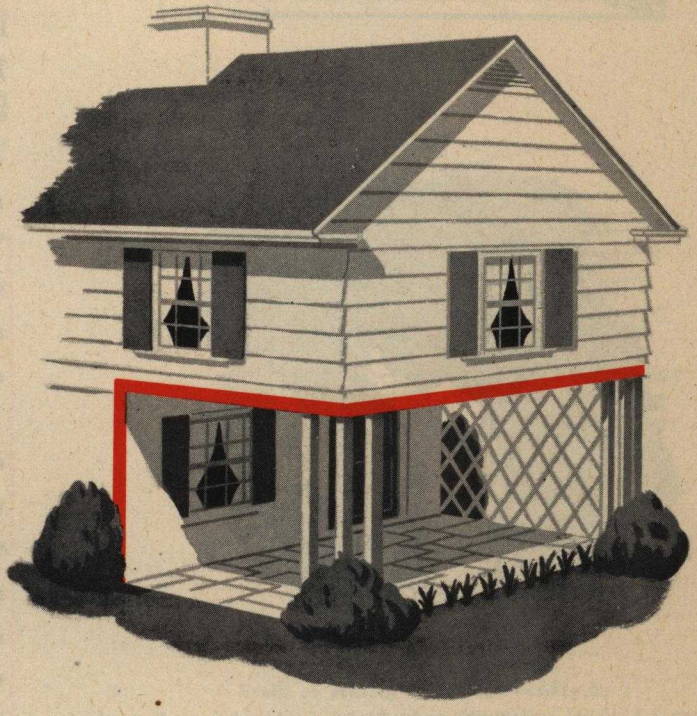
In some houses, ventilation is needed in winter. A competent insulation man can determine whether ventilation is required and make his recommendations accordingly.



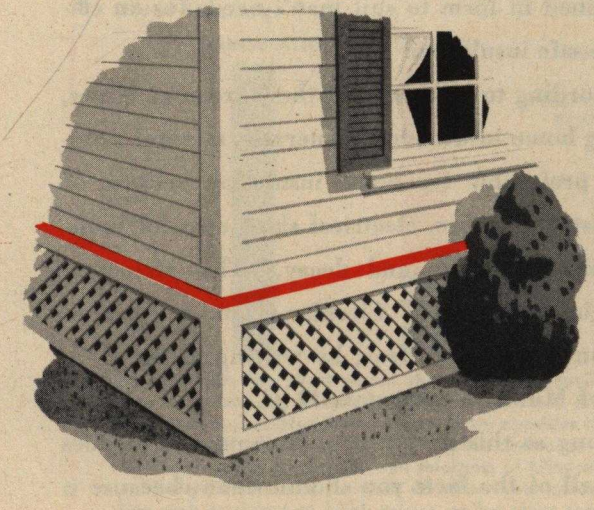
- The wall next to an unheated garage, as well as the floor of the room above it, should be insulated.



- Insulate all dormer windows thoroughly, including the wall sections.



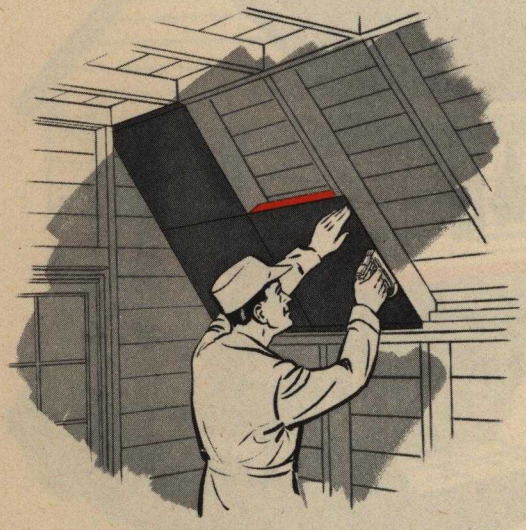
- Be sure to insulate the floors of bedrooms over unheated porches.



- Be sure to insulate floors raised over unexcavated or unheated sections.

The Characteristics and Features of

THE EFFICIENT INSULATION FOR YOUR HOME



• Skilled insulation applicators should be employed regardless of what type of materials used. The special problems that arise on almost any given job can only be solved by an experienced mechanic.

SO far, the unique value and special advantages of Mineral Wool have not been discussed in this booklet. The remaining pages will describe specific facts regarding Mineral Wool insulation — its nation-wide availability, the forms in which it is offered, its inherent qualities, the relation of costs to thickness and methods of installation. This information is intended to help the reader determine the superiority of Mineral Wool for use in his own home.

"Mineral Wool" is the broad term used to designate fibers made from mineral substances such as limestone and other rock, sand or the slag from ore smelting. Each type of raw material produces a type of Mineral Wool, known as "rock wool" when made of rock, "slag wool" when made of furnace slags, and "glass wool" when made of sand. They are made of nature's most enduring materials, merely combined and modified in form to suit man's needs for an efficient, fire-safe insulation.

According to a circular of the Bureau of Mines, discussing home insulation, "Generally, mineral products are preferable for home insulation because of their resistance to fire, electrical short circuits, moisture, termites, vermin and decay." This statement appears in Information Circular 7220, a copy of which you may obtain, free, by writing to the U. S. Bureau of Mines, Washington, D. C.

Strong as this government statement is, it does not give all of the facts you should know, because it does not deal with the important matters of cost, efficiency and the various forms of Mineral Wool insulation that you may obtain.

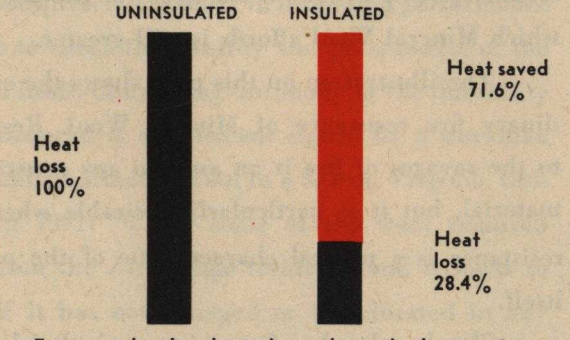
Mineral Wool

Efficiency

Mineral Wools are among the most efficient insulating materials available for houses, farm buildings, industrial buildings or any other structures. The simple explanation for such efficiency is that between the small fibers of wool there are innumerable dead air cells. It is these which delay the transfer of heat from the inner wall surfaces or ceilings to the outer surfaces and vice versa. They provide ideal resistance to the passage of heat.

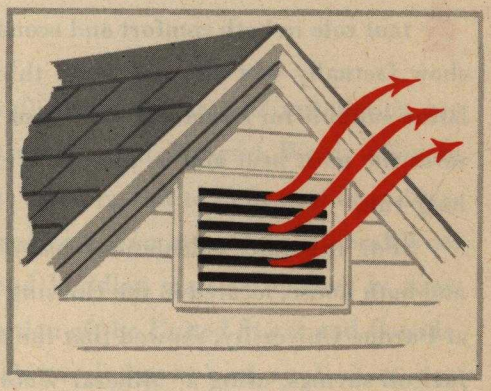
The high resistance of Mineral Wool to the flow of heat is strikingly illustrated by comparing the amount of heat loss through an ordinary uninsulated wall with the heat loss that occurs through the same wall when fully insulated with Mineral Wool.

Heat Saving Efficiency of Maximum Thickness Mineral Wool in Sidewalls. Frame Construction . . . Wood Siding and Wood Sheathing.



For example, the chart above shows the heat saving provided by installing Mineral Wool in a given wall area of a previously uninsulated frame house. If we consider the heat loss before insulation as 100%, it is seen that over 71% of this loss is saved by this full wall thickness of Mineral Wool.

Similar calculations for walls of other types of construction such as stucco or brick veneer, or for other areas such as attics or floors, would, in most instances, show even greater heat-saving percentages.



• Where louvers are used to ventilate attics place them at the peaks of the gable for maximum efficiency or use ridge and eave ventilators of any type that will assure good circulation of air above the insulation.

• Walls of existing homes can readily be insulated, but remember, "Insulation is no better than the man who installs it." Be sure to get a careful experienced applicator.

CONTINUED

THE Yardsticks on pages 8 and 9 show how this efficiency of Mineral Wool plays such an important role in both comfort and economy. They also show factually why the maximum thickness of insulation suitable for structural conditions is the one that saves the most heat and is, therefore, cheapest in the long run.

For example, calculations based on a 5-room-and-bath house, located in the Housing Research Area at Purdue University, showed that the average annual fuel oil savings, using 4" Mineral Wool in the ceiling and 3⅝" Mineral Wool in the sidewalls, would amount to about $72.84 per year. In the course of 20 years, this saving would total $1,456.80. In the same length of time, an investment of an amount of money equivalent to the cost of the insulation at 4 per cent compounded annually would bring only $297.50.

Similarly we find that the efficiency of Mineral Wool definitely affects our comfort both winter and summer. For example, in a room where the air is 70° (with outside temperatures at zero) the walls, if fully insulated, should measure not more than three degrees lower — 67°. Uninsulated, this wall would probably be an uncomfortable 59°. In summer the reverse would be true . . . efficient insulation helps to keep the temperature of the inside surface of the wall and roof lower than that of the outside.

● This photograph shows how incombustible insulation material often stops the spread of fire. In this particular case the fire department became lost and did not reach the blaze for an hour. The roof had burned off but the mineral wool insulation in the attic floor prevented the rest of the house from becoming a total loss.

Fire Resistance

As we have seen, Mineral Wools are made from rock, slag or sand, all incombustible materials, and therefore have inherent fire safety. Because of this characteristic, a good application of Mineral Wool adds substantially to the fire resistance of a wall or ceiling, giving valuable extra protection to the home in which it is installed.

In spite of all the advances made in the construction field, the problem of high annual fire losses is still a most serious one. Fire destroys many millions of dollars worth of homes and other property every year and on farms, where fire-fighting apparatus is seldom quickly available, the need for the protection which Mineral Wool affords is still greater.

The illustration on this page shows the extraordinary fire resistance of Mineral Wool. Resistance to the ravages of fire is an asset to any construction material, but it is particularly desirable when such resistance is a natural characteristic of the product itself.

Closely related to fire resistance is the electrical protection provided by Mineral Wool insulation. Approximately 10 per cent of fires resulting from known

causes are due to the misuse of electricity. Modern wiring standards are designed to prevent the hazard of fires of electrical origin. However, if faulty wiring exists in a house insulated with Mineral Wool, the heat and sparks of a short circuit will not ignite the surrounding insulation; in fact, the Mineral Wool offers valuable protection to the adjacent combustible building materials.

Durability

Other basic characteristics of Mineral Wool are also important in determining the choice of insulation for your home. Life-long durability is one of these, for Mineral Wool, being made from inorganic materials, will serve efficiently to provide comfort and economy throughout the life of your home — without repairs, without upkeep.

In any consideration of durability, length of service merits first place. Installations of Mineral Wool over fifty years old are still in service and have been followed through to the present day not only to determine their present efficiency in insulating performance but also to check the stability and permanence of the material itself. Convincing testimony to the durability of the material is a statement signed by a workman who installed Mineral Wool in a Salem, Virginia, residence in 1891: "I saw some of the wool removed lately from the Allemonge residence and it looks to me as if it has not changed or deteriorated in any degree except that it has gathered the dust of many years where exposed to the air." Additional records of a similar character are on file at the office of the National Mineral Wool Association.

Convenience

Ready availability and ease of installation are two more advantages that Mineral Wools offer to home-owners, to farmers, and to industrial or residential building operators. You can obtain Mineral Wool from lumber and building material dealers in practically every section of the United States and Canada. The industry also includes trained applicators prepared to install insulation in existing or new houses no matter where they are located — in thickly settled cities, rural villages or on farms. To locate these sources of supply, see the classified section of your local or nearest large city telephone directory.

Low Cost

A good part of the cost of a house is necessarily paid in wages to the skilled mechanics who build it. That is equally true in the application of insulation. It should never be assumed that double or triple the minimum thickness — usually one inch — doubles or triples the cost. It does not, because labor costs, which are sizable factors in insulation work, vary only slightly regardless of thickness. For example, the extra cost item for full-thick insulation over the cost of 1″ insulation on a new five-room house may amount approximately to $50., or on a twenty-year mortgage, a 10 per cent down payment of $5. plus a $45. balance payable over a period of 20 years. Added fuel savings from full-thick insulation will soon offset the added

CONTINUED

initial investment and will be a clear profit thereafter. See charts on pages 8 and 9 for savings involved. This explains why you cannot compare costs of insulation on the basis of the thickness alone.

You should depend on your insulation applicator or building contractor for an actual estimate of the installed cost of an efficient insulation treatment for your home. No amount of theorizing is worth as much as an actual estimate from a reliable applicator or builder.

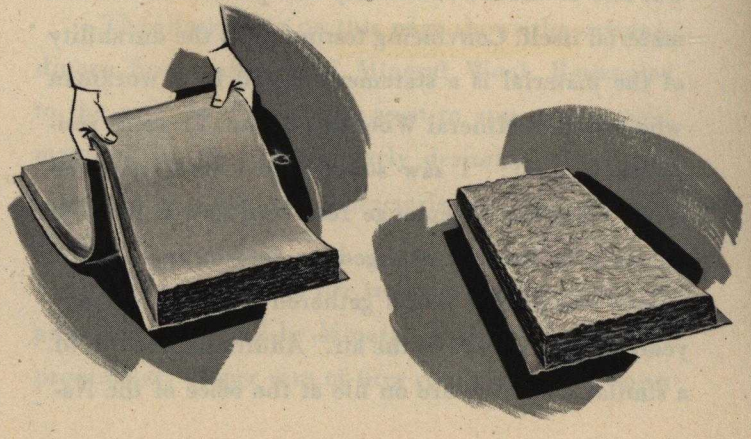
Dollar for dollar you may be sure that you will get more comfort, more fuel savings and more lasting satisfaction by using properly installed full-thick Mineral Wool insulation in both walls and ceilings.

Forms

Mineral Wools are manufactured into finished product form suitable for installation in practically every type of building construction. The best form for insulating any particular building should naturally be left to the experienced judgment of the trained insulation applicator or contractor doing your work, but in general the various forms are adapted for specific applications.

Flexible batts and blankets are the forms in which Mineral Wool is manufactured for use in new construction or in existing buildings when accessibility permits installation. They are usually made in thicknesses ranging from 1″ to full wall thickness. If 48″ long or less they are called batts. If over 48″ they are called blankets. In width they are made to fit between normally spaced joists, studs and rafters. They are composed of mineral fibers held together with a binding agent to form a felt and are commonly faced with a tough sheet of paper or are enclosed between two layers of paper. When one paper facing is supplied it is usually a vapor barrier which is installed with the paper toward the heated or interior side of the construction to help keep excess humidity present in the indoor air from working outward through the walls. When paper is used on both sides, the sheet on the outer face is always of a porous type to let vapor pass through it readily, conforming to the Federal Housing Administration's specifications which have been adopted after many years of study.

The granulated, nodulated, shredded or loose wool forms are used as *fill* insulations and are ordinarily used for insulating homes already built. Sometimes they may be installed by hand, but usually they are pneumatically blown into hollow spaces or between floor or ceiling joists because application by air results in more uniform densities in hard-to-reach areas and, therefore, gives more even coverage. Pneumatically blown Mineral Wool is installed in walls to the full thickness of the wall spaces — usually 3⅝″ — while the installation depth in unfloored attics is normally 4″. Where attics are floored, or in similar construction, the installation depth is usually governed by the joist sizes.



LEFT: Illustration of Mineral Wool Blanket.

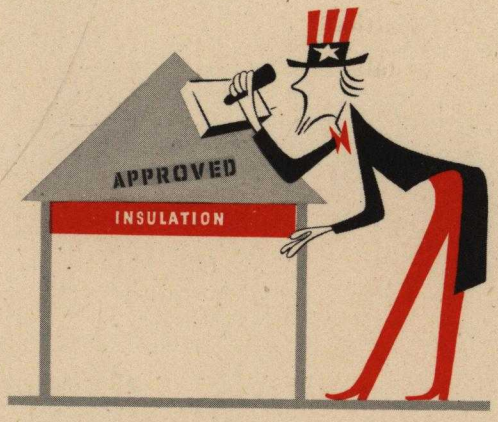
RIGHT: Illustration of Mineral Wool Batt.

CONCLUSIONS

BECAUSE Mineral Wools are so durable, savings and comfort should be considered from a long-range viewpoint in any house.

To get a detailed picture of the fuel economy, you can turn to the Yardstick of Comfort and Economy on pages 8 and 9. There you will find that $2.12 is saved for each 100 sq. ft. of insulated wall area for each heating season under the conditions established. (See chart on page 8.) If your house had, say, 1600 square feet of such sidewall construction you could save, through these sidewalls alone, 16 × $2.12 or $33.92 on your heating bill during one heating season. Therefore, assuming a "life expectancy" for your house of a mere 20 years, your long-range savings would be $678.40 – definite proof of the close relationship of durability and economy. In addition to these wall savings you would also effect additional economies through insulation installed in the attic areas. This can be determined by using the Yardstick for Ceilings on page 9.

● Durability, as typified by the monumental carvings in the Black Hills of South Dakota, is an inherent characteristic of mineral wool insulation.



● 3 inches of mineral wool insulation in the attic satisfies the minimum standards recommended for dwellings by the Federal Public Housing Authority.

The more you learn about the values which Mineral Wool insulation can contribute to your home, the more certain it is that you will take advantage of them. Because the Mineral Wool industry, with its well-developed technical skills, knows that there are sound reasons why its products meet the approval of experts in the field of insulation, it has prepared this booklet to show you how comfort and economy go hand-in-hand. The more economy you derive from insulating your home with Mineral Wool, the greater the comfort it will bring to you.

With that fact in mind, you can modernize your present home or build your new one with the knowledge that a few added dollars invested in Mineral Wool insulation will actually repay you more than its initial cost in saved fuel and will provide winter and summer comfort year after year.

THE NATIONAL MINERAL WOOL ASSOCIATION

1270 Sixth Avenue • Room 2906 • New York 20, N. Y.

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Only a limited number of copies is available. When you have finished with it, therefore, won't you pass it along?